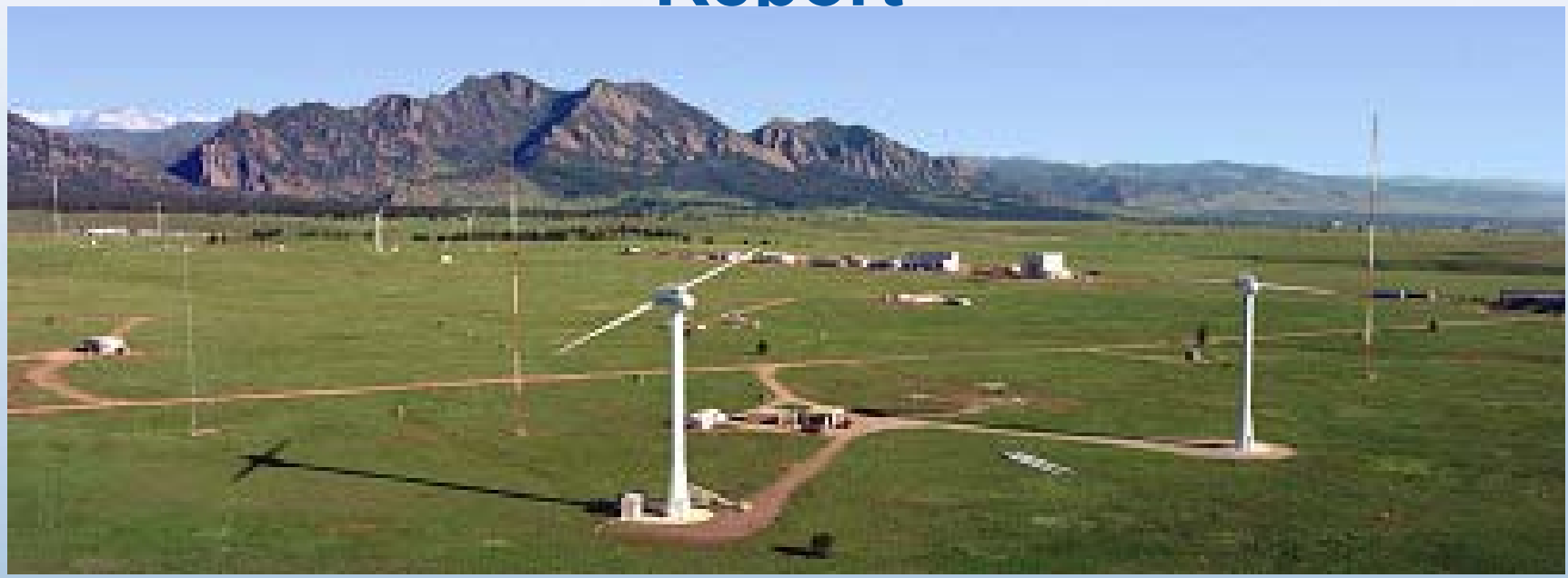
Summary of the Clean and Diverse Energy (CDEAC) Wind Task Force Report



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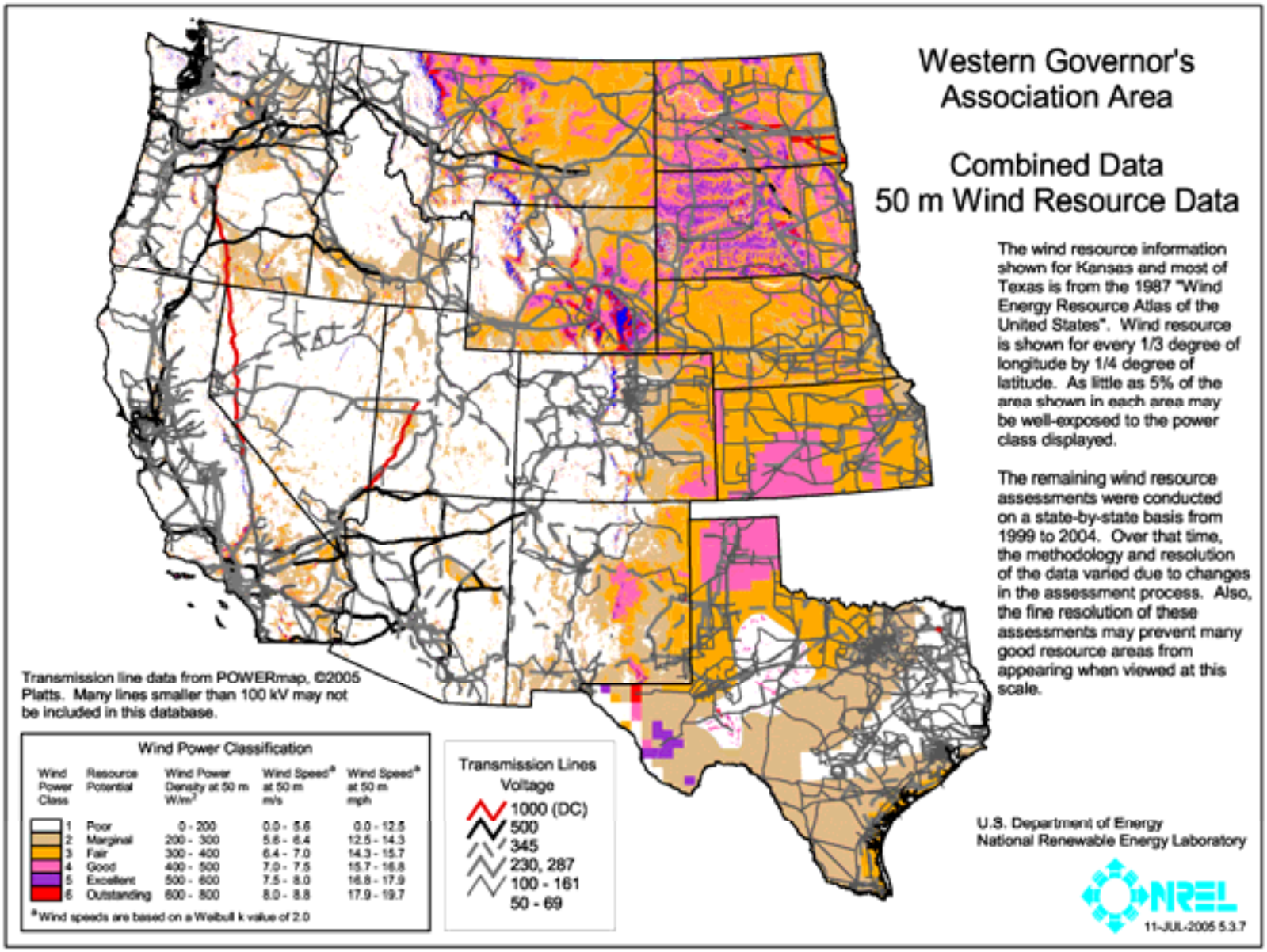
Outline

- What is CDEAC and where did it come from?
- Wind Task Force objectives
- Wind supply in the WGA footprint
- Wind scenarios
- Task Force recommendations
- Summary

What is CDEAC and Where did it Come From?

- Western Governors' resolution: 30 GW clean power in the west
- Task forces: wind, biomass, geothermal, solar, clean coal, energy efficiency, transmission
- Task force charge: Determine
  - How technology could contribute to goal
  - What are the barriers and how could they be resolved?

WGA Footprint

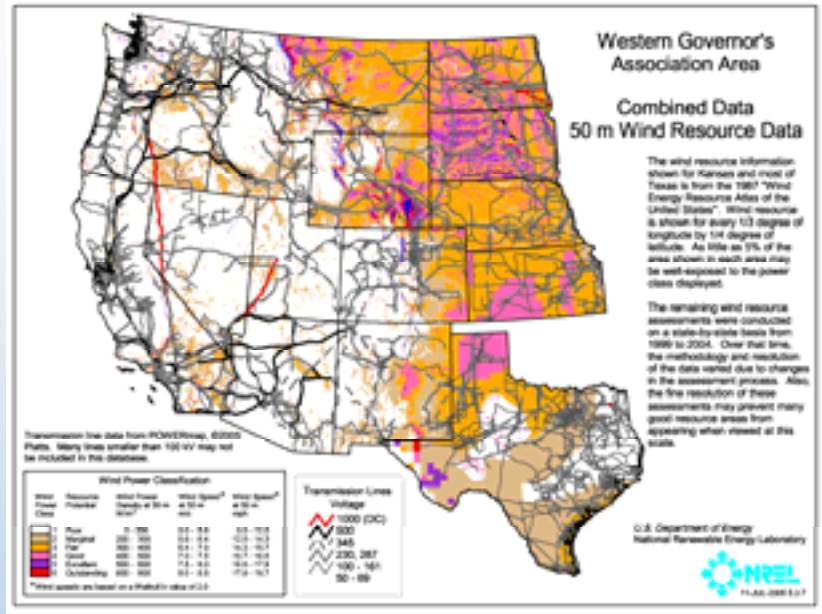


Wind Task Force Objectives

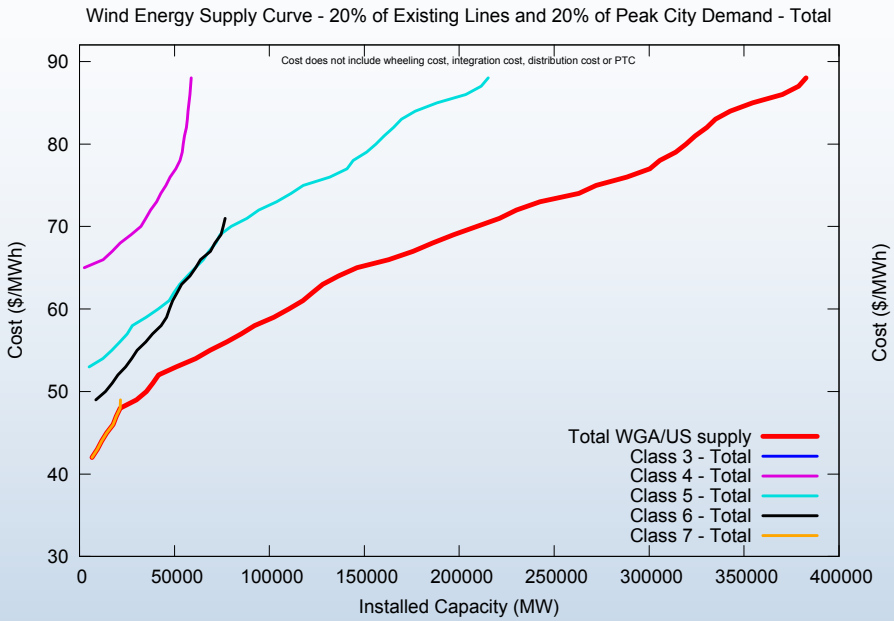
- Develop supply estimates for wind
- Construct wind scenarios for transmission modeling of the Western Interconnection
  - Capacities
  - Bus locations
  - Hourly generation profiles
- Recommendations to achieve 30 GW goal/wind contributions to the goal

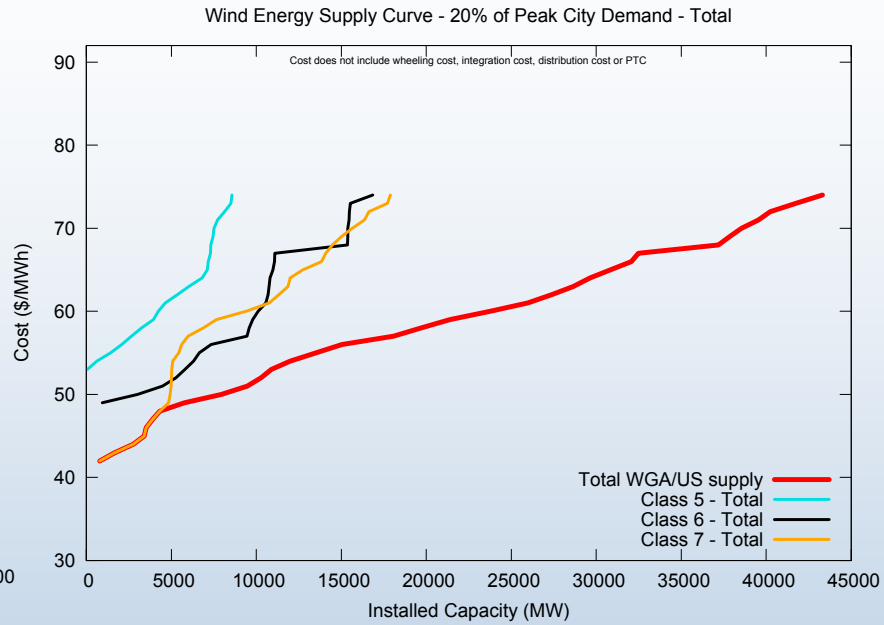
Supply Curve Development

- Objective to quantify wind availability in WGA footprint
- Based on GIS data used for map development
- Binned by wind class → creates step in supply curve
- Static transmission line ratings and loads
- Wind speed @ 50 meters (modern turbines @ 80 m, 100 m in near future)
- Maps may miss good wind sites; some maps need updating
- Modern/existing wind turbine technology (does not consider technical progress/cost reductions)
- Current costs have spiked: trend or temporary blip?



WGA Supply Curves for Wind



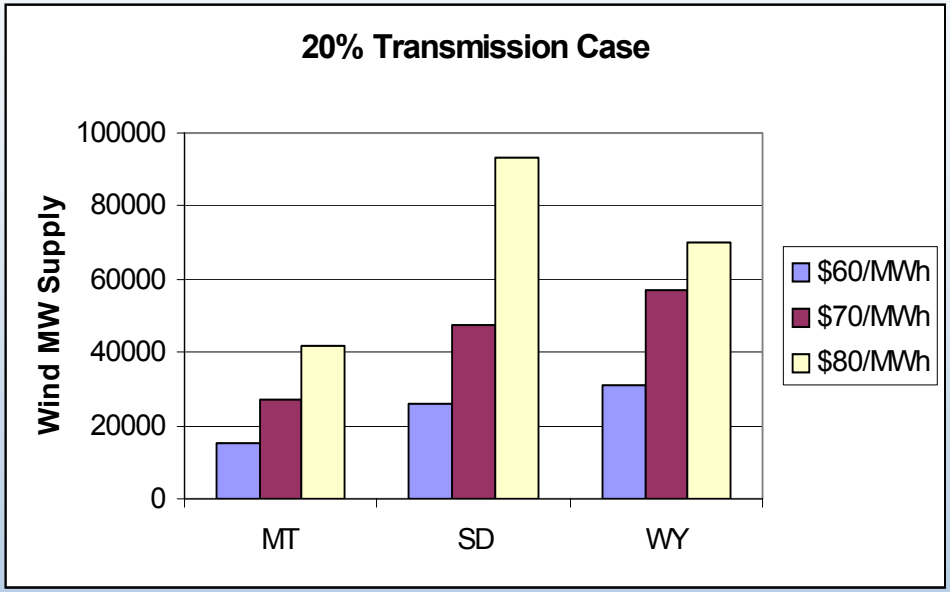


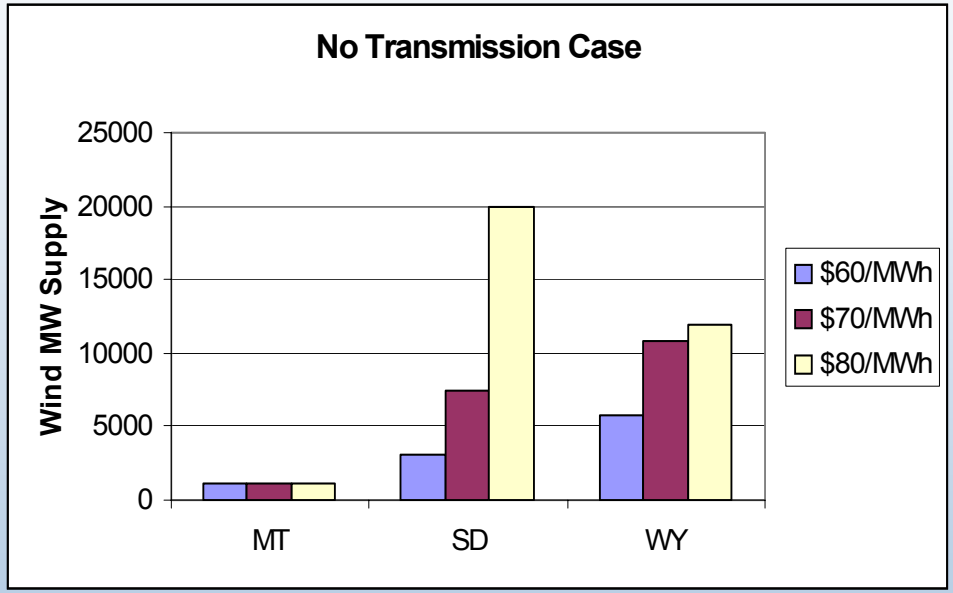
WGA/CDEAC States

Price	20% Transmission	No Transmission	Difference
$60/MWh	115,000	25,000	90,000
$70/MWh	215,000	39,000	176,000
$80/MWh	320,000	40,000	280,000

Available transmission increases the supply of wind: some high-wind states

Note different scales





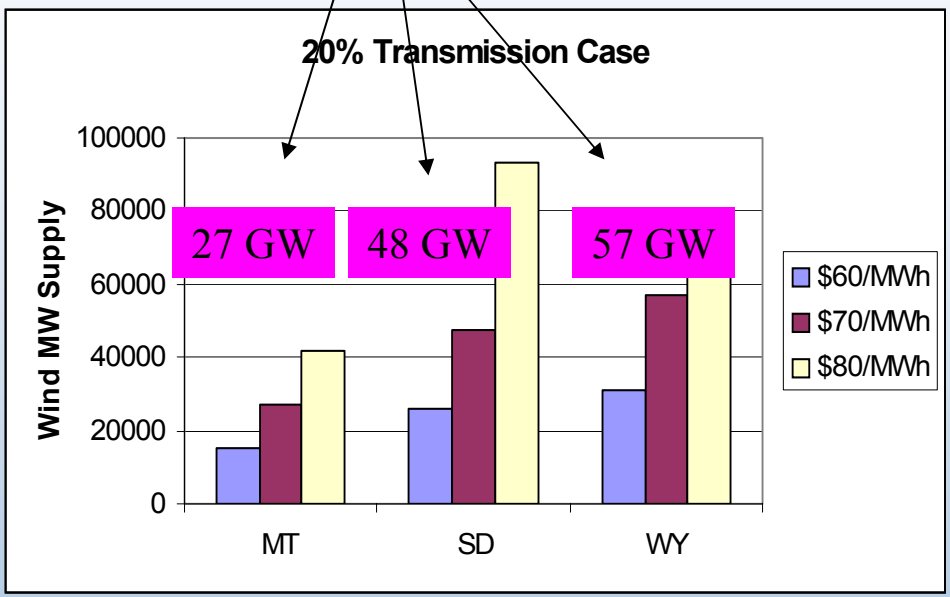
Assuming 20% of existing transmission is available for wind

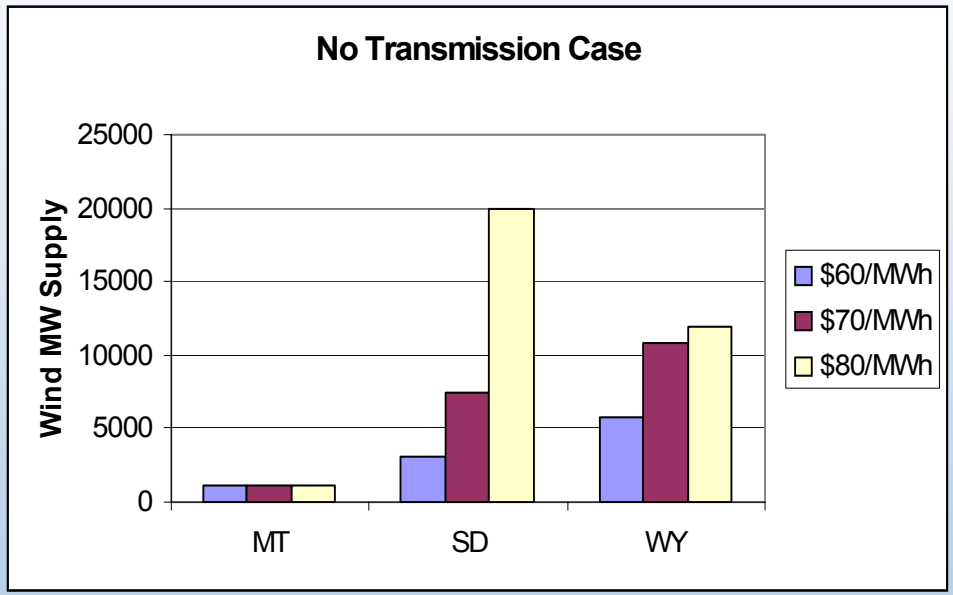
Assuming no existing transmission is available for wind, all new transmission is built by wind

Available transmission increases the supply of wind: some high-wind states

At $70/MWh: 132 GW from 3 key states if 20% of wind can fit on transmission

Note different scales





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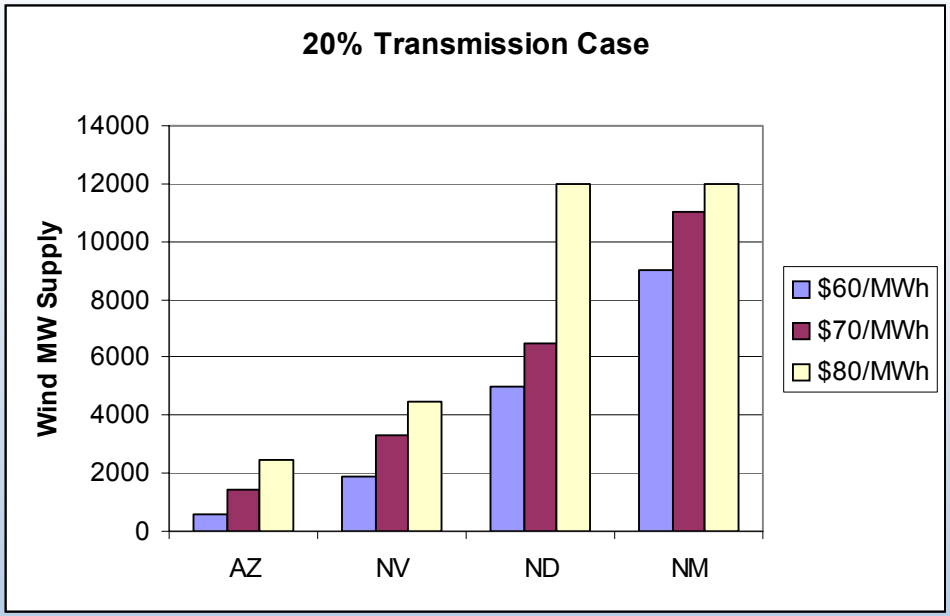
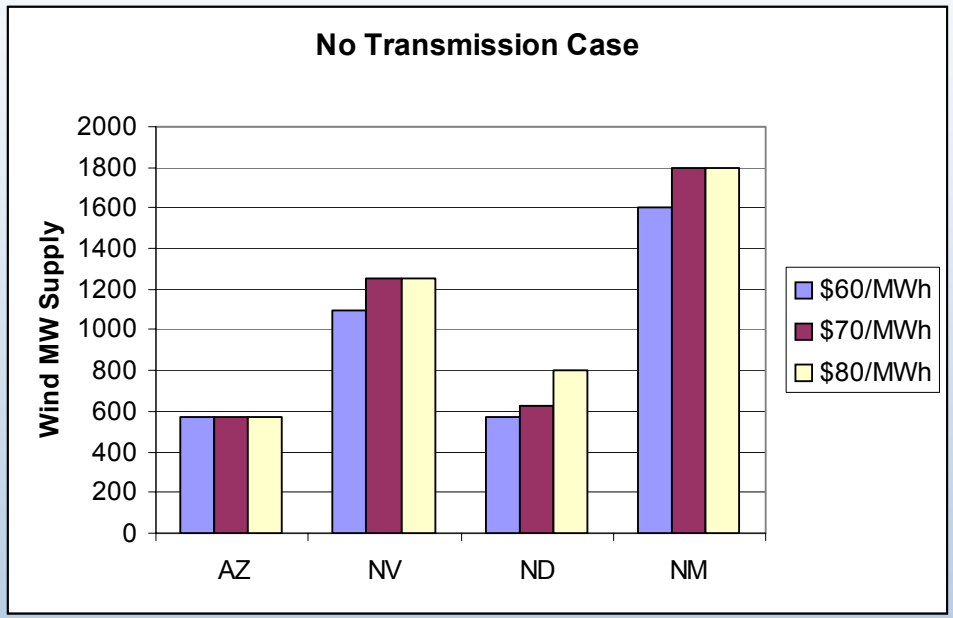
Other States

Note different scales





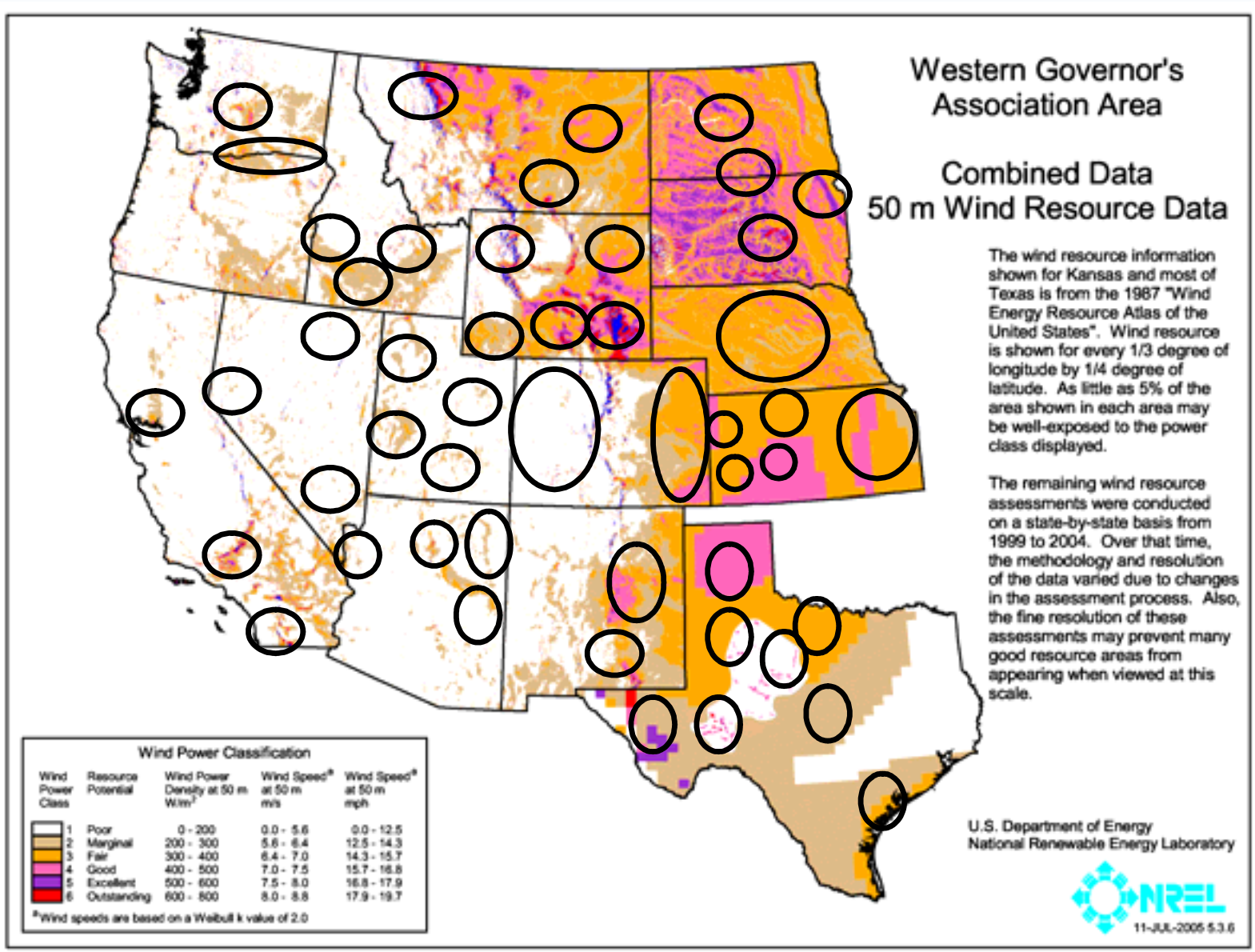
Assuming 20% of existing transmission is available for wind

Assuming no existing transmission is available for wind, all new transmission is built by wind

Scenario Development

- Supply curve does not indicate which wind locations/supplies developed first
  - IRP
  - RPS
- Compiled information from regional and subregional transmission studies, IRPs, and RPS requirements
- Three scenarios: low, medium, high

Wind Task Force Aggressive Scenario Based on Existing IRP, RPS, Transmission Studies: Nearly 55 GW of Wind



Western Governors' Association
Wind Additions: Scenario 1

No new transmission, limited flex-firm, low-range of build out

Total: 9,175 MW

Western Governors' Association
Wind Additions: Scenario 2

New flex-firm transmission, mid-range of build out

Total: 25,266 MW

Western Governors' Association
Wind Additions: Scenario 3

Maximum build-out. NM and CA cases may not be consistent

Total: 54,724 MW

Task Force Recommendations

- Support PTC extension
- Implement a conditional-firm, redispatch, and related tariff reform transmission products where feasible and consistent with ISO or RTO policy. Support the review and reasonable assessment of Available Transfer Capability (ATC) on existing transmission paths.
- Reform imbalance penalty policy based on cost-causation principles and link to near-term scheduling and wind forecasting.
- Urge state commissions, state legislatures, and FERC to encourage expanded transmission services and facilities for wind resource development areas to meet RPS, IRP and state goals (renewable trunk lines).

Task Force Recommendations (2)

- Enhance regional transmission planning capabilities to better identify beneficiaries of transmission expansion, recognizing that some benefits of transmission expansion are widely distributed;
- Urge Public Utility Commission (PUC) findings that transmission projects to support meeting Renewable Portfolio Standards (RPS) requirements are a public benefit and should be granted rolled-in rates/cost recovery;
- Coordinate federal-state-local-tribal siting for transmission and wind projects, and develop transmission corridors on federal lands.

Task Force Recommendations (3)

- Support studies of integration costs for higher levels of wind penetrations and allow utility cost recovery of such study costs.
- Support studies of opportunities for federal Power Marketing Administrations to integrate large amounts of wind into the power system.
- Support studies and R&D to develop storage and generating options that can complement the intermittency of wind generation.
- Government wind support
  - Require that state utility commissions implement incentives for regulated utilities that make new wind resource acquisitions a profitable course of action through performance based regulatory systems.
  - Direct the acquisition of state/educational institution wind
  - Encourage tribal/local government wind procurement (green tags)
  - Pursue smaller wind projects for self generation

Next Steps

- WGA meets next week to consider the report
- National Wind Coordinating Council moving forward: Transmission Workshop in Denver, Jul 18-19

Summary and Conclusions

- Significant wind resource near transmission—easily enough to meet the WGA goals
- Wind costs depend on transmission proximity and loading
- With current wind turbine cost uncertainties, unclear how long-term supply will respond
- Near-term development may not strictly follow supply curves: RPS, IRP are drivers
- CDEAC Wind Task Force Report on the web

  http://www.westgov.org/wga/initiatives/cdeac/wind.htm